LUNAR RECONNAISSANCE ORBITER: STATUS AND SUPPORT FOR FUTURE MISSIONS. N. E. Petro and J. W. Keller, NASA Goddard Space Flight Center, Solar System Exploration Division, Greenbelt, MD (Noah.E.Petro@nasa.gov, John.W.Keller@nasa.gov).

Introduction: Launched in 2009, the Lunar Reconnaissance Orbiter (LRO) has collected more data than any prior NASA planetary science mission to date [1]. In its first year of operations LRO focused on characterizing the Moon and its environment in preparation for future exploration. It was during this first year that targeting of the NASA Constellation Program's Regions of Interest [2] was conducted in earnest. We continue to characterize the lunar surface and environment in detail, with all measurements made by LRO supporting not only cutting-edge science, but also with an eye towards exploration.

LRO Support for Future Missions: LRO data is critical for future missions and several science questions derived from LRO observations should be addressed by future missions. Derived data products are available that support future surface exploration. These tools enable safe exploration of the lunar surface [3-5], and with continued operations LRO can continue to collect targeted observations of potential landing sites, a resource unavailable from any other existing asset.

High-resolution imaging: The LRO Camera Narrow Angle Camera (NAC) images the lunar surface at a resolution commensurate with the altitude of the spacecraft [6]. Based on the local lunar time of day an image is acquired one may be able to identify small (~1.5 m diameter) craters or boulders at the scale of resolution. From these high-resolution images, other derived products are produced:

1) DTM's: These maps require multiple images acquired, typically on successive orbits, with optimal lighting conditions [4]. The illumination requirement places limits on when such images of any particular location can have such data collected.
2) Featured mosaics: When multiple adjacent images are acquired, a mosaic of NAC images are generated, producing a seamless image of a larger region [7].

Rock Abundance: While the rock abundance at any particular location on the lunar surface can be verified by visually identifying rocks [8], a derived data product from the Diviner instrument provides a unique dataset for quickly identifying relatively-block free regions [9]. This product provides a quick method for assessing regions which may be more, or less, suitable for landing sites.

LRO will deliver data to the PDS at a three-month cadence. Currently >900 Tb of data has been delivered to the PDS, the largest data volume of any NASA Planetary Science Division mission. A number of higher-level data products are in the PDS archive, including mosaics, topographic products, and derived products (*e.g.*, rock abundance from Diviner, local slope). These products are available on the LRO PDS archive (http://pds-geosciences.wustl.edu/missions/lro/) and on individual instrument team websites.

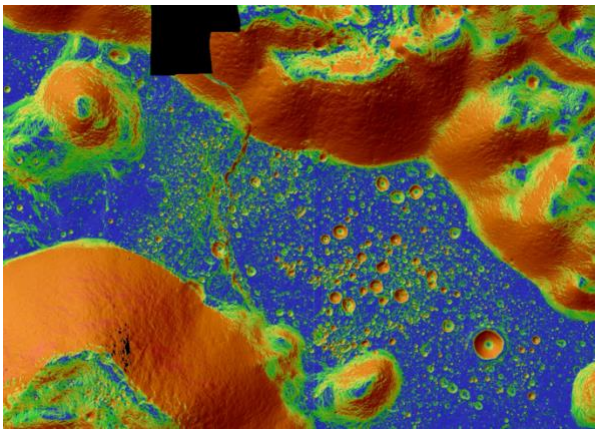

Figure 1. Example of multiple LROC NAC DTM's mosaicked to cover the entire Taurus—Littrow Valley. The individual DTM's are available at 2 meters per pixel from the LROC website.

References:[1] Keller, J. W., et al., (2016) *Icarus*, 273, 2-24. [2] Gruener, J. E. and B. K. Joosten, (2009) LEAG, 1483, 50-51. [3] Speyerer, E. J., et al., (2016) *Icarus*, 273, 337-345. [4] Henriksen, M. R., et al., (2017) *Icarus*, 283, 122-137. [5] Barker, M. K., et al., (2016) *Icarus*, 273, 346-355. [6] Robinson, M. S., et al., (2010) *Space Science Reviews*, 150, 81-124. [7] Henriksen, M. R., et al., (2015) LPSC, 1846, [8] Watkins, R. N., et al., (2017) LPSC48, [9] Bandfield, J. L., et al., (2011) *J. Geophys. Res.*, 116, E00H02.